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ADRENAL MEDULLA OF WHITE SWISS MICE (Mus Musculus) AND LAYING HENS (Gallus Domesticus)

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SUMMARY

Adult white swiss mice and laying hens were used to study the adrenal medulla. Samples of adrenal glands were collected and fixed in formal – dichromate solution and six micron thick sections were stained by Harris H & E. Light microscopic observations reveal that adrenal medulla of both white Swiss mice and laying hens were built up of two types of chromaffin cells, without any characteristic features of zonation. In laying hens : our data revealed that medullary tissue was intermingled with the cortical one and the adrenaline cells were mainly distributed in the subcapsular region, while large central vein was seen in the medulla of white Swiss mice surrounded mainly by noradrenaline cell.

INTRODUCTION

Adrenal gland is a complex organ concerned with the production of multiple hormones. There were morphological variation between cells of different parts of the gland relate to the type of hormone products (1). There were no remarkable differences between male and female counterparts in respect of histomorphology and fiberoarchitecture of the adrenal medulla of domestic animals such as horse, dog, goat, sheep and pig (2). Fine structure of the adrenal medulla has been also described in dog (1), rat (3), chicken (4) and monkey (5). There were types

of secretary cells in adrenal medulla of various species (6,7). Two distinct adrenaline and noradrenaline cells were also demonstrated in all the domestic animals sharing with large central vein (8) except the fowl (9).

MATERIALS AND METHODS

The adrenal glands of sixteen adult white swiss mice (Mus Musculus) were excised under chloroform anaesthesia and ten of laying hens (Gallus Domesticus) were excised immediately after sacrificing them. Pieces of adrenal tissues were fixed in formal – dichromate solution (10) and after three days of fixation, the fixed tissues were washed-out overnight in running tap water. Dehydration in graded ethyl alcohols, clearing in xylene and embedding in paraffin wax were carried out through routine procedures. Paraffin sections of six micrometers thick were cut with rotary microtome. Sections were stained by Harris haematoxylin and eosin (11).

RESULTS

Two distinct types of medullary cells were identified in the adrenal medulla of white swiss mice. First type was large, faintly stained yellowish polyhedral cells, characterized by centrally located nuclei with fine granular cytoplasm (Fig. 1). They were grouped in follicular-shaped clusters, mostly distributed in the center of medullary tissue, surrounding a large central vein (Fig. 2). The second type of medullary cells was observed yellowish – brown and polyhedral in shape. They were characterized by indistinct granular cytoplasm, with smaller nuclei than in the first type (Fig. 1). These cells were distributed in a trabecular manner between the follicular clusters of the first type of medullary cells. On the other hand, corticomedullary area revealed the presence of predominating yellowish-brown medullary cells other than the other type.

Some ganglion cells were grouped in the corticomedullary junction. The microscopic findings of adrenal laying hens denoted that the cortical and medullary tissues were intermingled together (Fig. 3). Their cells were not distributed in any characteristic pattern. Two types of medullary cells were encountered which gave differential staining affinity. Cells of the first type were small, polyhedral in shape with central located nuclei. They were distributed mostly in the center of the gland and have faintly stained yellowish cytoplasm. Cells of the second type have yellowish-brown granular cytoplasm and mostly distributed in the periphery of the gland, especially in the subcapsular region.

DISCUSSION

The endocrine glands were processed the essential components of the complex neuroendocrine apparatus in which the hormones provides the basis for internal regulation and adjustment to the changing environment (20). The presence of two types of medullary cells in adrenal medulla of white swiss mice reinforces those findings in rat, cat, ox (7); calf (12); mouse (13); monkey (5); Indian buffalo (8) and in the horse, dog, goat and sheep (2). The first type of medullary cells surrounding the large central vein is in agreement with many previous findings (8,13,14). Follicular-shaped clusters of the medullary cells in white swiss mice were also recorded in adrenal medulla of ruminants (8,15). It was proved that the medullary cell surrounding the large central vein as noradrenaline cells which were faintly stained those intensely stained, located in the periphery of the medulla as adrenaline producing cell and such observations support our findings. Moreover, some ganglion cells grouped at the corticomedullary junction of white swiss mice were also noticed in rat (16) and donkey (17). Adrenal cortex and medulla of laying hens were

found intermingled together as previously recorded in the fowl (2,9). The presence of two types of medullary cells in the adrenal medullary tissue of laying hens is in close agreement with previous investigations (2,7,9,10,18). The presence of predominating adrenaline cells in the subcapsular region of laying hens is in accordance with those found in fowl (2,9,19). There is no evidence of presentation of large central vein in the adrenal medulla of laying hens. This was also recorded in the fowl (2,21).

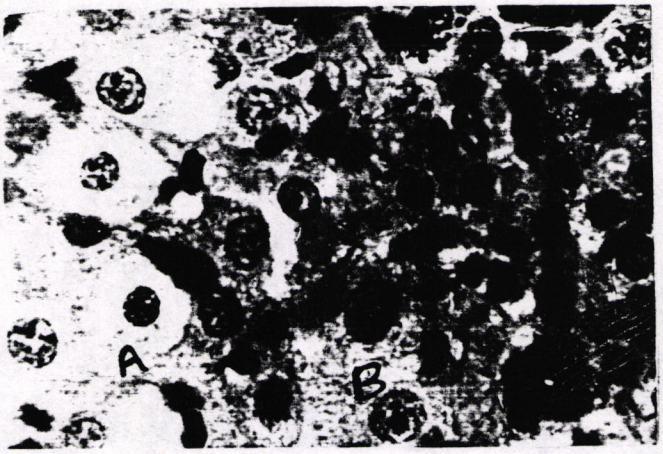
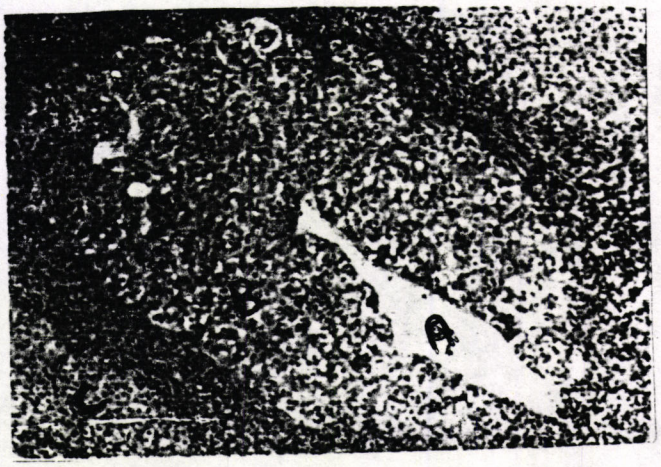


Fig. 1 : Adrenal medulla of white swiss mice. H & E, 500X.
A- First type of medullary cells.
B- Second type of medullary cells.



Fi.g. 2 : Adrenal gland of white swiss mice. H & E, 125X.
A-Central vein.
B- Medullary tissue.
C- Cortical tissue.

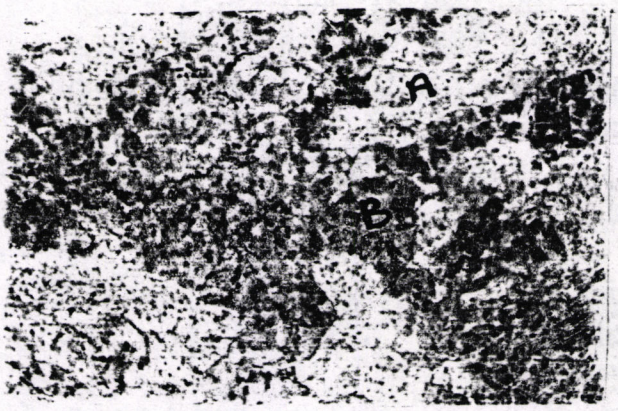


Fig. 3 : Adrenal gland of laying hen. H & E, 125X.
A- Cortical tissue.
B- Medullary tissue.

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نخاع الكظر في الفئران البيض السويسرية (Mus Musculus) والدجاج البياض (Gallus Domesitcus)

فايق جبار الصفار

فرع التشريح والأنسجة والأجنة ، كلية الطب البيطري ، جامعة بغداد ، بغداد ، العراق.

الخلاصة

استخدم في هذه الدراسة فئران بيض سويسرية بالغة ودجاج بياض. جمعت نماذج الأنسجة لكلا النوعين وثبتت في محلول الفورمالين – ثنائي الكروم. قطعت النماذج النسيجية بسماكة 6 مايكروميتر وصبغت بصبغة الهاريز هيماتوكسلين – أيوسين. لوحظ عند الفحص المجهري الضوئي ان نخاع الغدة الكظرية لكل من الفئران البيض السويسرية والدجاج البياض يتكون من نوعين من الخلايا النخاعية. كما لوحظ في الدجاج البياض ان النسيج النخاعي يتداخل مع النسيج القشري ، ولا يوجد وريد مركزي كبير ، وتتوزع خلايا الأدرينالين بشكل مميز تحت المحفظة. بينما لوحظ في الفئران البيض السويسرية وجود وريد مركزي محاط بخلايا الأدرينالين.